

WEATHER BALLOONS

Did you know?

The United States' federal weather service -- known today as the National Weather Service (NWS) -- has been taking upper-air observations since the late 1930s. To take these observations, a compact instrument package called a radiosonde (pictured to the right) is suspended from a large balloon.

As the balloon ascends, the radiosonde sensors take continuous temperature, relative humidity, & pressure readings. These measurements are then sent to a ground receiver by way of a radio frequency transmitter. A GPS antenna allows for location tracking and the calculation of wind speed & direction.

Rising at about 1,000 feet per minute, the flight can last in excess of two hours. During this time the balloon typically ascends to over 100,000 feet and can drift more than 125 miles from where it was released.

When the balloon has reached its elastic limit (generally around 20-25 feet in diameter!) it will burst, and a small parachute will help to slow the descent of the radiosonde.

Flight Train

BALLOON

PARACHUTE

DE-REELER

RADIOSONDE

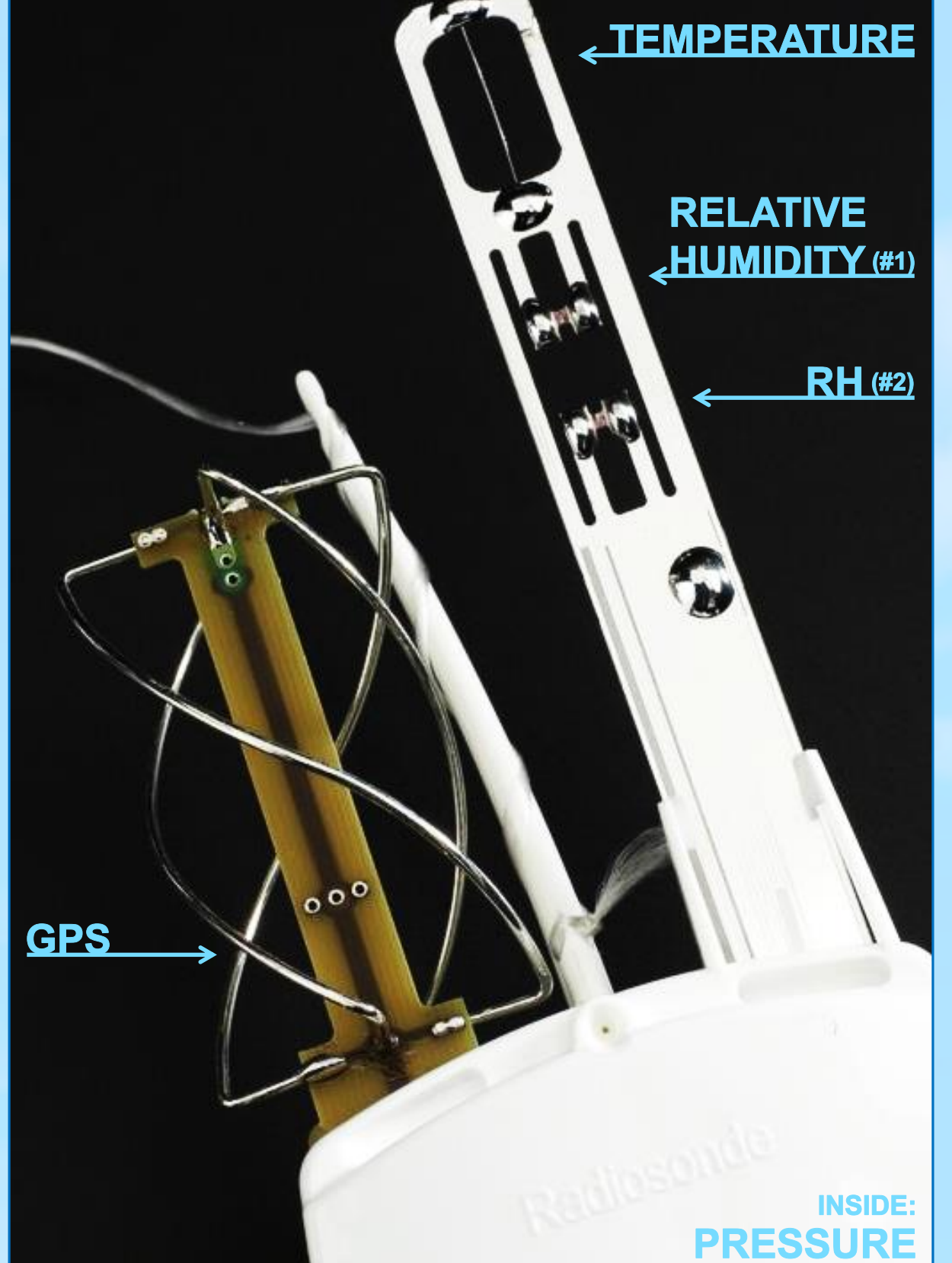


Data are used for:

- Weather Prediction Models
- Severe Weather, Aviation, Fire, & Marine Forecasts
- Climate Change Research
- Air Pollution Models

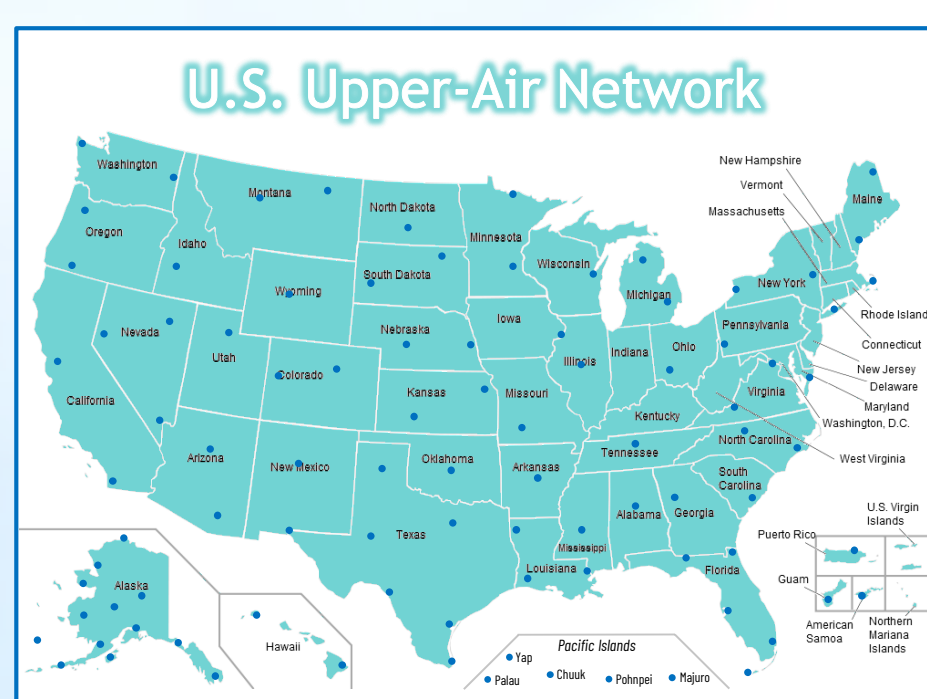


Radiosonde



Anatomy of a radiosonde:

- Sensor boom with a thermistor & two relative humidity sensors
- Spiral GPS antenna
- Pressure cell & sonde circuitry (inside)
- Antenna & mailing bag tube (bottom)



Almost 900 stations worldwide perform upper-air observations, launched around the same time every day -- for 00 and 12 UTC. The NWS oversees observations for 92 stations: 69 in the lower 48 United States, 13 in Alaska, 9 throughout the Pacific region, and 1 in Puerto Rico. The NWS also supports the operation of 10 upper-air sites in the Caribbean.



Women's first opportunities in meteorology occurred in the 1940s, as a result of WWII. Women joined the Weather Bureau as observers and forecasters to fill job vacancies. By 1945, over 900 women were in the Bureau -- with many offices made up almost entirely of women!



Up, Up, and Away!

Roughly 20% of U.S. radiosondes are recovered and can be repaired for future use. As to be expected, that number is smaller for coastal locations like the Florida Keys.

Check out some stats from a March 2020 flight! ⇨

Along a Balloon's Flight...

Burst Height:	20.6 mi (33.16 km)	Release Time:	705 pm
Lowest Pressure:	7.27 mb (0.21 inHg)	Burst Time:	846 pm
Coldest Temp:	-106 °F (-76.8 °C)	Duration:	101 minutes
Strongest Winds:	71 mph (62 kts)	Average Speed:	1,073 ft/minute
Distance Away:	27.8 mi (44.7 km)	Data Points:	12,161

